

CLAIMS

We claim:

- 1) In photoacoustic biometric measurement systems, disposable couplings comprising: a substrate element having thereon an optical coupling means arranged to efficiently pass optical energy from at least one optical source into human flesh; and an
5 acoustic coupling means arranged to efficiently pass acoustic energy to and from at least one acoustic transducer into human flesh.
- 2) Disposable couplings of claim 1, said substrate is a disk shaped element
10 having axial symmetry and is arranged to cooperate with a measurement head having optical and acoustic transducers.
- 3) Disposable couplings of claim 1, further comprising spatial coupling means arranged on either surface of said substrate to promote spatial stability and reduce
15 movement between said coupling and a tissue test site.
- 4) Disposable couplings of claim 1, further comprising spatial coupling means arranged on either surface of said substrate to temporarily affix said substrate to said measurement head.
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- 5) Disposable couplings of claim 3, said coupling being disposed at or near the periphery of said substrate.
- 6) Disposable couplings of claim 2, optical coupling means is arranged on a
25 symmetry axis of said disk.
- 7) Disposable couplings of claim 6, said optical coupling includes an index matching fluid or optically compatible gel.
- 8) Disposable couplings of claim 7, said optical coupling further includes a
30 thin film anti-reflection coating between an optical source and tissue at a test site.

9) Disposable couplings of claim 7, said optical coupling further includes a lens operable for focusing and concentrating light into abbreviated tissue space.

5 10) Disposable couplings of claim 9, said lens is immersion type lens with live tissue as part of lensing medium.

10 11) Disposable couplings of claim 6, said optical coupling is an aperture cut into said substrate.

12) Disposable couplings of claim 2, said acoustic coupling means is further comprised of at least one acoustic conduit, said acoustic conduit operable for providing communication between tissue and a microphone.

15 13) Disposable couplings of claim 12, said acoustic conduit includes holes or vias through said substrate.

20 14) Disposable couplings of claim 12, said acoustic conduit is in contact with tissue via an acoustic coupling gel.

15) Disposable couplings of claim 13, said acoustic conduit is a dense material press fit into receiving holes in the substrate.

25 16) Disposable couplings of claim 12, said dense material includes a curved contact surface suitable for being directly in contact with skin surface.

17) Disposable couplings of claim 12, said acoustic coupling means includes a mesh element within aperture cut into said substrate.

30 18) Disposable couplings of claim 17, said mesh element includes acoustic coupling gel thereon.

19) Disposable couplings of 17, said substrate includes multiple regions distributed about an annulus.

5 20) Disposable couplings of claim 2, said acoustic coupling means includes a plurality of apertures in the substrate which permit direct contact between at least one microphone and tissue being tested via said holes in substrate.

10 21) A photoacoustic biometric measurement system comprising:
a durable wearable portion and a disposable, lifetime sensitive, coupling element of claim 1.

22) A photoacoustic biometric measurement systems of claim 21, said durable wearable portion comprising: an optical source and an acoustic transducer.

15 23) A photoacoustic biometric measurement systems of claim 21, said disposable portion comprising: a thin substrate element; an optic coupling means arranged to efficiently pass optical energy from at least one optical source into human flesh; and an acoustic coupling means arranged to efficiently pass acoustic energy to and
20 from at least one acoustic transducer into human flesh, said thin substrate being arranged to have thereon said acoustic coupling means and said optic coupling means.